UKOPA

United Kingdom Onshore Pipeline Operators' Association

Emergency Response for Non-Pipeline Incidents

Emergency Response for Non-Pipeline Incidents

A hypothetical pipeline…

- 1970's construction, welded steel
- 10" diameter, 7mm wall thickness
- 50 bar Operating Pressure
- Transporting Refined Liquid Hydrocarbon
  - Volume: 0.05m^3/m
  - Flow rate: 200m^3/hr
    3,300 litres/min

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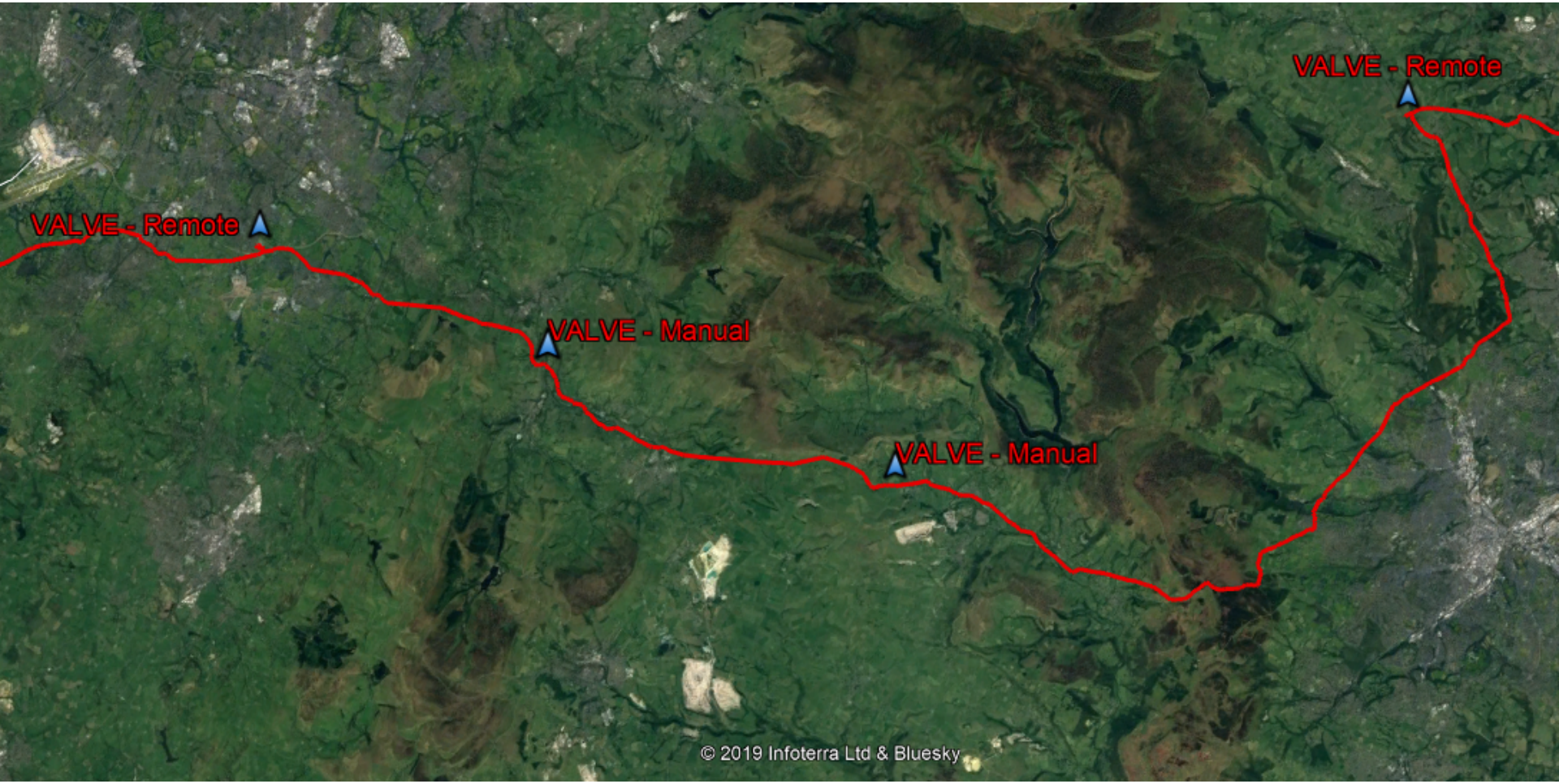
A hypothetical pipeline…



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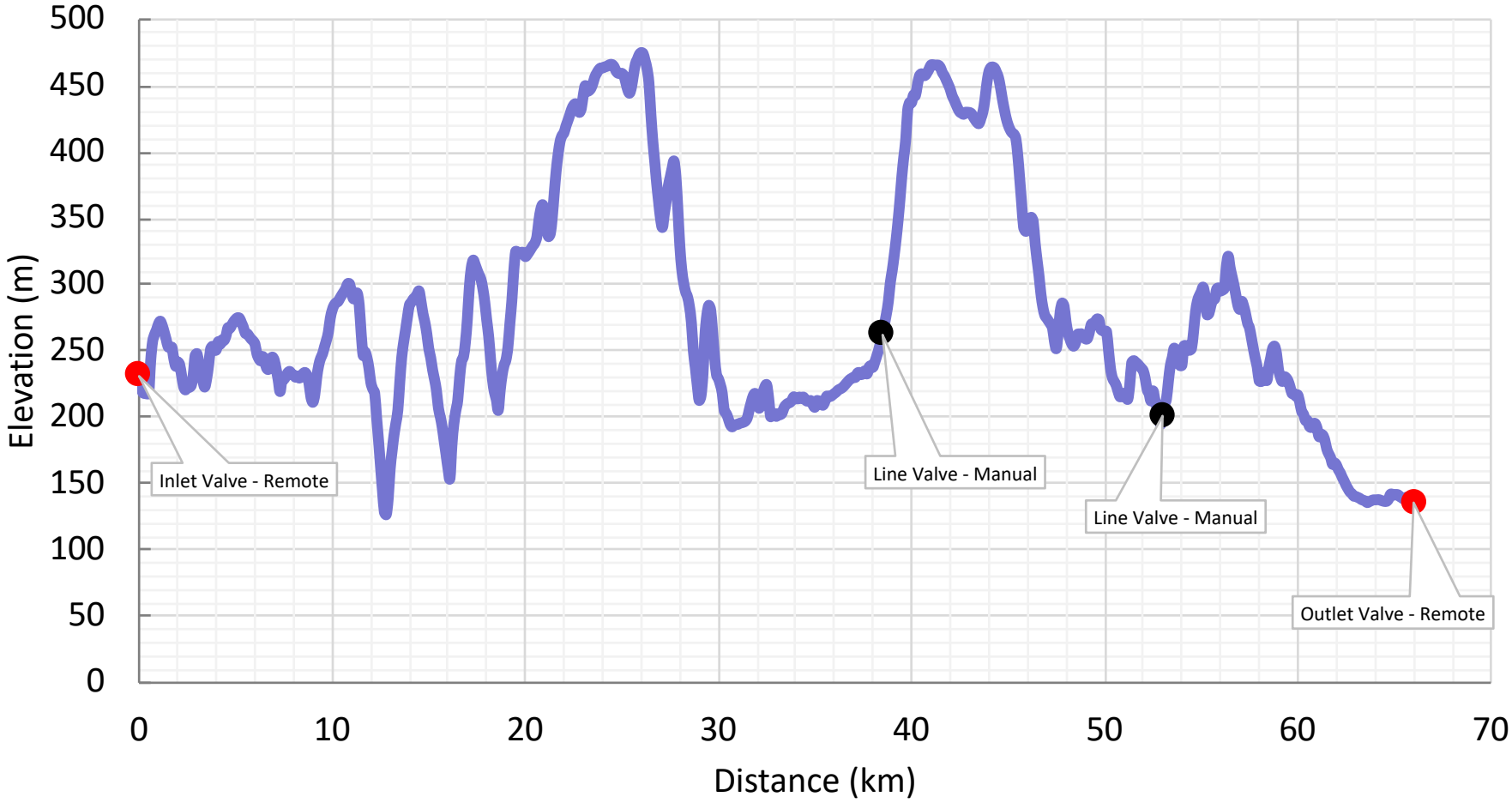
Elevation Profile



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UKOPA (Draft) GPG :

Assessing residual drain-down from oil pipelines

- Describes a mathematical model to calculate draindown volume for a leak or rupture at any point on the pipeline
- Three things to consider;
  1. Pumped Volume
  2. Gravity Draindown
  3. Vacuum Draindown

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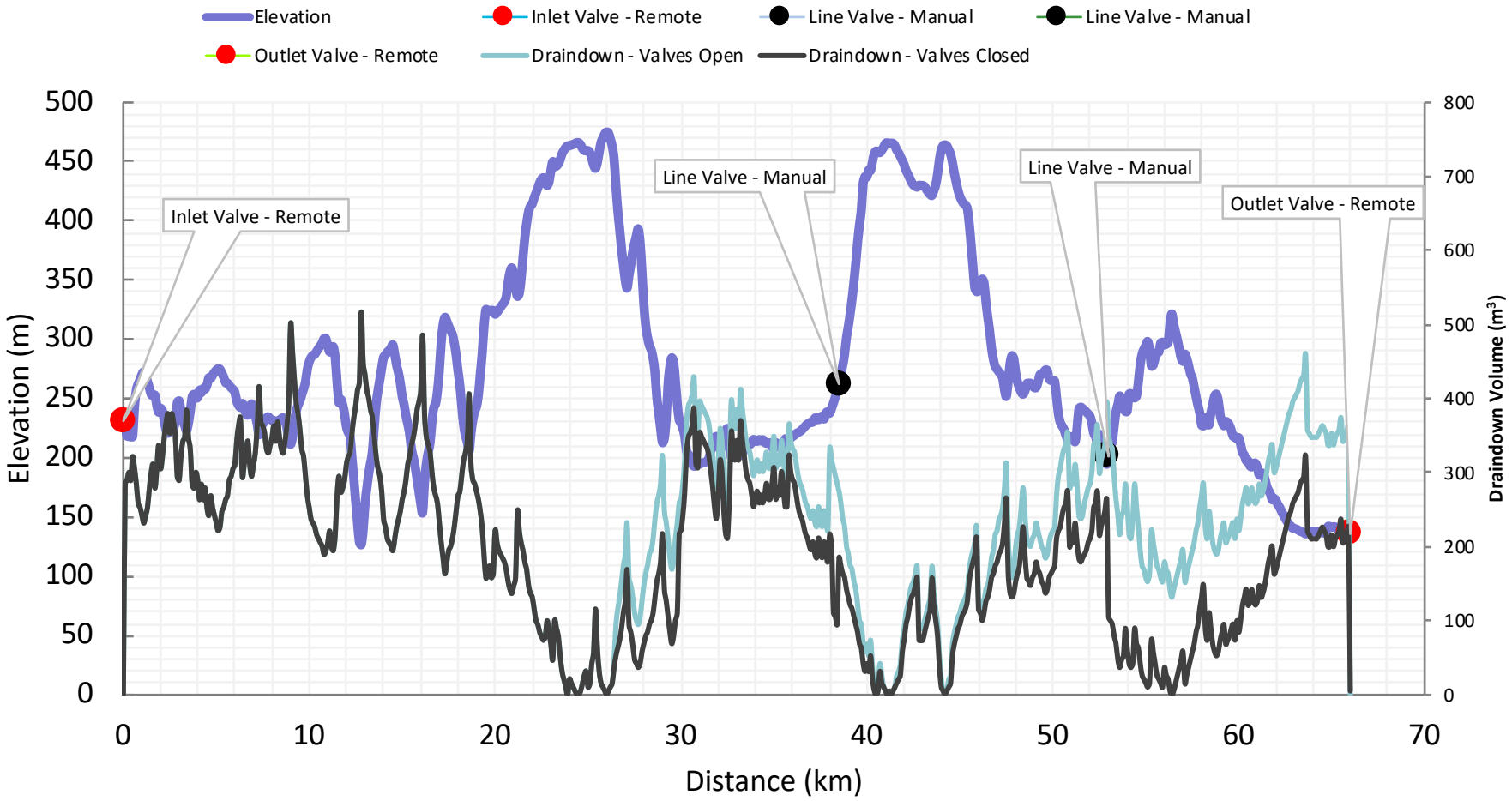
Draindown Calculation



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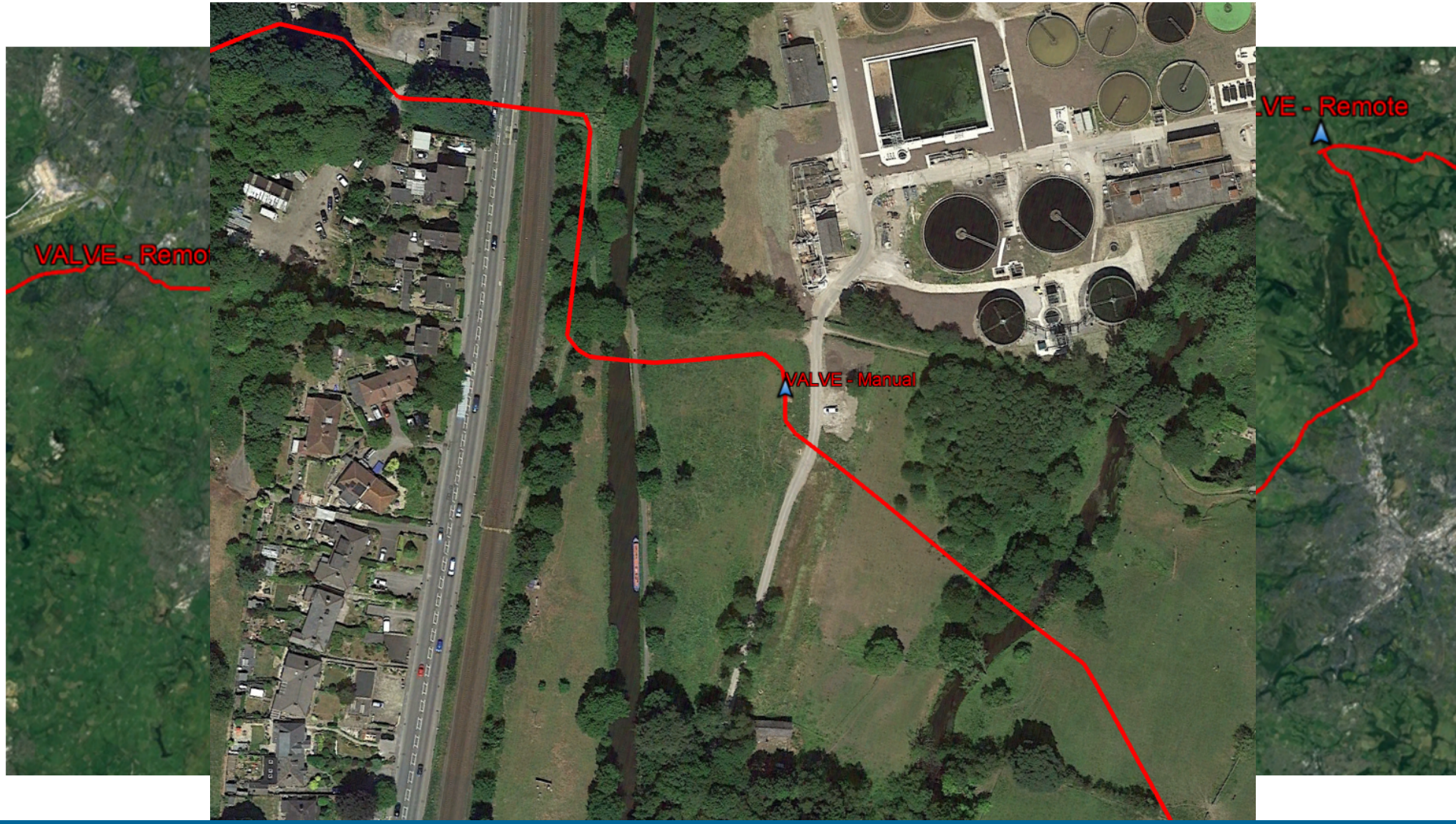

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Mirror NEWS POLITICS SPORT FOOTBALL CELEBS TV FILM ROYALS WEIRD NEWS TECH MONEY TRAVEL FASHION MUMS COMPETITIONS QUIZZES GOT A STORY?

News › UK News › Environment Agency

Whaley Bridge dam 'collapse': Town evacuated as 'danger to life' warning issued

An emergency evacuation is in place at Whaley Bridge in Derbyshire after Toddbrook Reservoir has been severely damaged by heavy rain

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By Paul Byrne, Abigail O'Leary, Amber Hicks & Tiffany Lo
20:40, 1 AUG 2019 | UPDATED 01:35, 2 AUG 2019

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INDEPENDENT

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News > UK > Home News

Whaley Bridge dam collapse: Villagers may not be allowed home for six more days as more storms forecast

Reservoir water levels need to be reduced by seven metres before it can be made safe, engineers say - but more bad weather is on way

Colin Drury | @colin_drury | Saturday 3 August 2019 18:11 |

Getty

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https://www.youtube.com/watch?v=c5X8kB8axm8

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Monday Morning Conversation:

What a wet weekend!

Did you see the news about that reservoir?

Yeah. Pretty incredible.

Is that anywhere near our pipeline?

Err…Maybe…We'd better check…

Should we be doing something about it?

Ummm…What can we do…?

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What is the risk?

Scenario:

Dam fails, and the resulting flood washes out the pipeline, causing it to rupture.

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What is the risk?

Risk = Likelihood x Consequence

What is the Likelihood?

- *Obviously credible given response of authorities*
  - *How can we quantify likelihood for this scenario?*
  - *Do we need to quantify it?*
  - *Can we affect/reduce it?*

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What is the risk?

Risk = Likelihood x Consequence

What is the Consequence?

- *Pipeline Rupture, leading to Environmental Damage, and possible Health and Safety impacts on the public*

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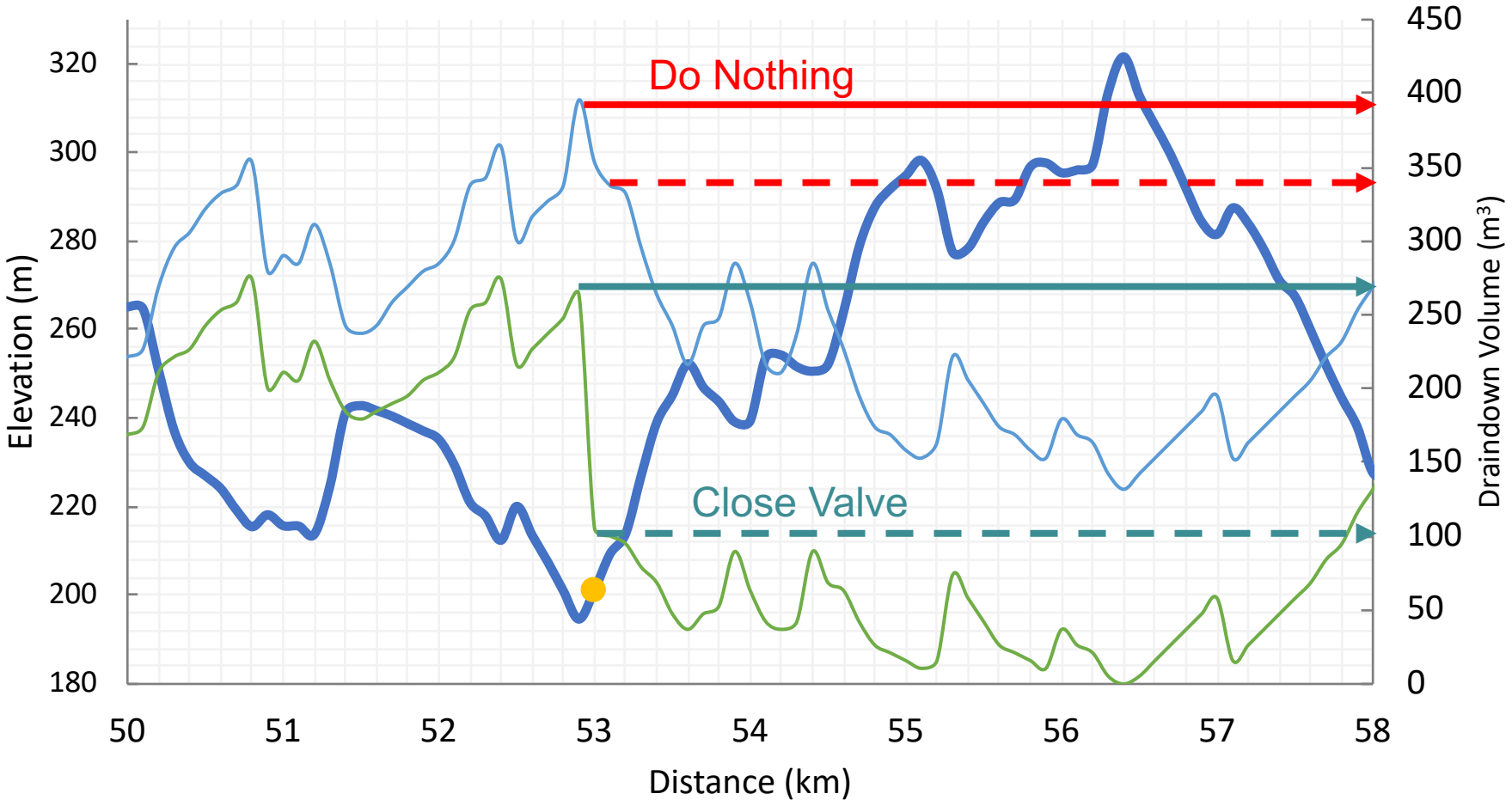
Consequence Assessment



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Consequence Assessment

***Baseline** (do nothing, and react if a rupture occurs)*

- *Potential loss of 16m³ (5 mins pumped volume), plus;*
  - *390m³ (rupture at the river)*
    - *406m³ total*
  - *340m³ (rupture at the canal)*
    - *356m³ total*

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Consequence Assessment

Mitigation Option 1 *– Stop Pumping. React further in the event of a rupture.*

- *Saves about 16m^3 pumped volume, compared with shutting down after a rupture*
  - *390m^3 (rupture at the river)*
  - *340m^3 (rupture at the canal)*

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Consequence Assessment

Mitigation Option 2 *– Stop Pumping. Close Valve at the River.*

- *260m^3 (rupture at the river)*
- *100m^3 (rupture at the canal)*

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Consequence Assessment

Mitigation Option 3 *– Emergency Pipeline Clearance.*

- *No loss of containment (if completed before the dam fails)*

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Consequence Assessment

Option No.	Description	Number of UKOPA Votes
0	Do Nothing	
1	Stop Pumping, react further if a rupture occurs	
2	Stop Pumping, Shut Line Valve	
3	Clear Pipeline	

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Consequence Assessment

Option 4 *– Call in sick and hope someone else makes the decision.*

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Consequence Assessment - Results

Baseline *– Do nothing*

- *How would you justify this decision to the CA, in the event of a failure?*

- *Can this course of action be justified as ALARP?*

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Consequence Assessment - Results

Options 1 and 2

- *Still a sizeable oil spill (Between 390m^3 & 260m^3 at the river).*
- *With a 6-day shutdown, it means 28,800m^3 of fuel is in the wrong place*
  - *Enough to re-fuel ~600,000 cars*
  - *Retail value of around £30m*
- *Significant regional fuel shortages*
- *Serious direct and indirect financial and reputational damage*

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Consequence Assessment - Results

Option 2

Valve is located within the exclusion zone, so it can't be safely accessed.

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Consequence Assessment - Results

Option 3 – Pipeline Clearance

- *All the financial and reputational disadvantages of Options 1 and 2;*
- *Will take at least 3 days to implement, by which time the worst of the risk has passed.*

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Consequence Assessment

Additional Mitigation Actions

- *Clean-up response teams on standby*
- *Identify and prepare booming locations for spill containment*
  - *In floodwaters?*
- *Communicate the pipeline rupture risk to emergency services*
- *Other Actions…*

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So, in summary, this presentation has…

- *Described a serious and credible threat to (hypothetical) pipeline infrastructure*
- *Identified some mitigation options that are not very effective or commercially palatable*
- *Completely failed to describe a usable risk assessment process*
- *Hopefully given people something to think about…*

Emergency Response for Non-Pipeline Incidents

Round Table Discussion

- *What types of incidents might fall into a similar category of Non-Pipeline Emergencies?*
- *What mechanisms are in place to identify these incidents, and to escalate them for further assessment or action?*
- *How can they be risk assessed?*
- *What mitigation options might be available to the pipeline operator?*